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APPENDIX 6.11-1: TRANSPORTATION ANALYSIS

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6.11 TRAFFIC AND TRANSPORTATION

This section presents an evaluation of the existing traffic and transportation systems in the Site region and the potential effects of the Project on these systems. The Site is located in a rural, sparsely populated area that has nearby rail access. It is also adjacent to Interstate 5 and is otherwise surrounded by agriculture and open space. Roads and highways near the Site generally have light to moderate traffic loads much of the day and night. The availability of rail access together with the adjacent interstate provides convenient access to the Site for industrial equipment delivered from distant locations.

The only potential for the Project to affect traffic and transportation systems in the Site area would come from Project construction. The analysis contained in this section demonstrates that these effects would not be significant. Peak construction activities, where up to 425 workers will commute to local roads to the Site each day would only last for approximately 2 months, and the average construction employee volume would be only 240 workers over the 20-month construction period. Further, the construction employees would arrive at the Site by 7:00 a.m. and depart in mid to late afternoon.

Project construction will also involve delivery truck traffic as equipment and materials are brought to the Site. An average of 10 to 15 delivery trucks a day will arrive and depart the Site during the 20-month construction period. Addition of this number of trucks to the existing traffic on local roads will not create adverse levels of service (as defined by local transportation authorities) on local roads and highways. In addition, heavy and oversized deliveries will occur under appropriate oversize permits. These permits are granted after timing of delivery and routes are selected that would minimize impacts on local traffic and transportation systems. For all of these reasons, Project construction affects on traffic and transportation systems will not be significant.

Once Project construction is completed, permanent Project operational on local traffic conditions will have negligible effects on local roads and highways. The largest routine operating shift consists of 15 to 20 employees. Less than five deliveries by trucks will be required each day. This traffic volume is small and will not be noticeable on local roads. As a result, long-term effects to traffic and transportation systems in the vicinity of the Site will not be significant.

The traffic analysis for the Project was prepared by TPG Consulting, Inc. The analysis is summarized in this section. Additional summary tables are contained in Appendix 6.11-1. Due to the volume of worksheet analyses that support the summary information, the worksheets are not reproduced in Appendix 6.11-1. Instead, a compact disk, or printout of the worksheets that support this traffic analysis is available upon request. Two-lane roadway segment levels of

service (LOS) were calculated using the *1997 Highway Capacity Manual (1997 HCM)* methodologies contained in the *1997 Highway Capacity Software (HCS 3)*. Unsignalized intersection levels of service were calculated using the *2000 Highway Capacity Manual (2000 HCM)* methodologies contained in the *2000 Highway Capacity Software (2000 HCS)*. Signalized intersection levels of service were calculated using *Synchro 5.0* software which also incorporates 2000 HCM methodologies. Ramp merge/diverge and freeway segment levels of service were analyzed using the *2000 HCS*.

6.11.1 EXISTING CONDITIONS

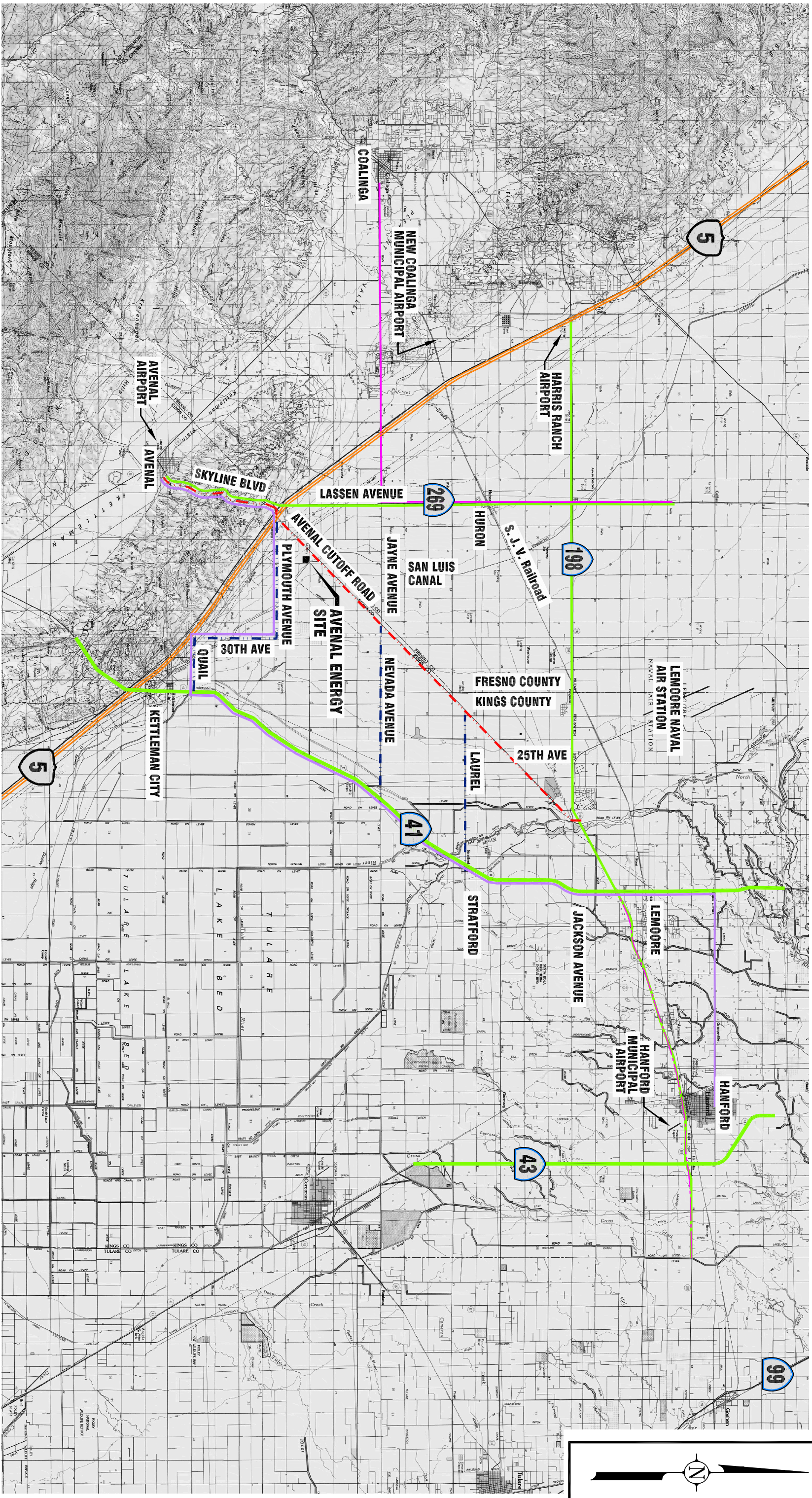
The following is a description of existing traffic and transportation facilities in the Project region including roads, highways, freeways, rail lines, bike trails, airports, bus routes, pipelines and canals. Regional traffic and transportation facilities are discussed in Section 6.11.1.1. Local traffic and transportation facilities are described in Section 6.11.1.2. New traffic and transportation facilities planned in the Project area by either the City of Avenal, Kings County or Caltrans are discussed in Section 6.11.1.3.

6.11.1.1 Regional Setting

Figure 6.11-1 shows the regional traffic and transportation facilities. The Site is located in the southwest portion of the San Joaquin Valley, approximately 2 miles east of Interstate 5 on Avenal Cutoff Road. This region is rural and sparsely populated, with agriculture serving as the primary land use. Two small communities, the City of Avenal and Kettleman City, are located about 6 miles southwest and 8 miles southeast, respectively. Figure 6.11-2 details the existing road system, bus routes, canals and major pipelines near the Project. There are no existing bicycle routes in the area.

6.11.1.1.1 Roads and Highways

The major highways and roads in the Project vicinity are shown in Figure 6.11-1. Interstate 5 is located approximately 2 miles west of the Site. Interstate 5 runs north and south between San Diego County and the Oregon State line. State Route (SR) 198, located approximately 11 miles north of the Site, runs from SR 101 in Monterey County to the Sierra Nevada Range. Route SR 41 passes approximately 6 miles to the southeast. This route runs from SR 1 in San Luis Obispo County to the



LEGEND:

Circulation Designations

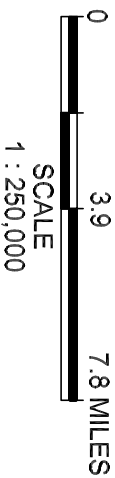
- Interstate
- Principal Arterial
- Minor Arterial
- Major Collector

Transit Services

- Orange Belt Bus Route
- Kings Area Rapid Transit (KART) Route
- Coalinga Transit

References:

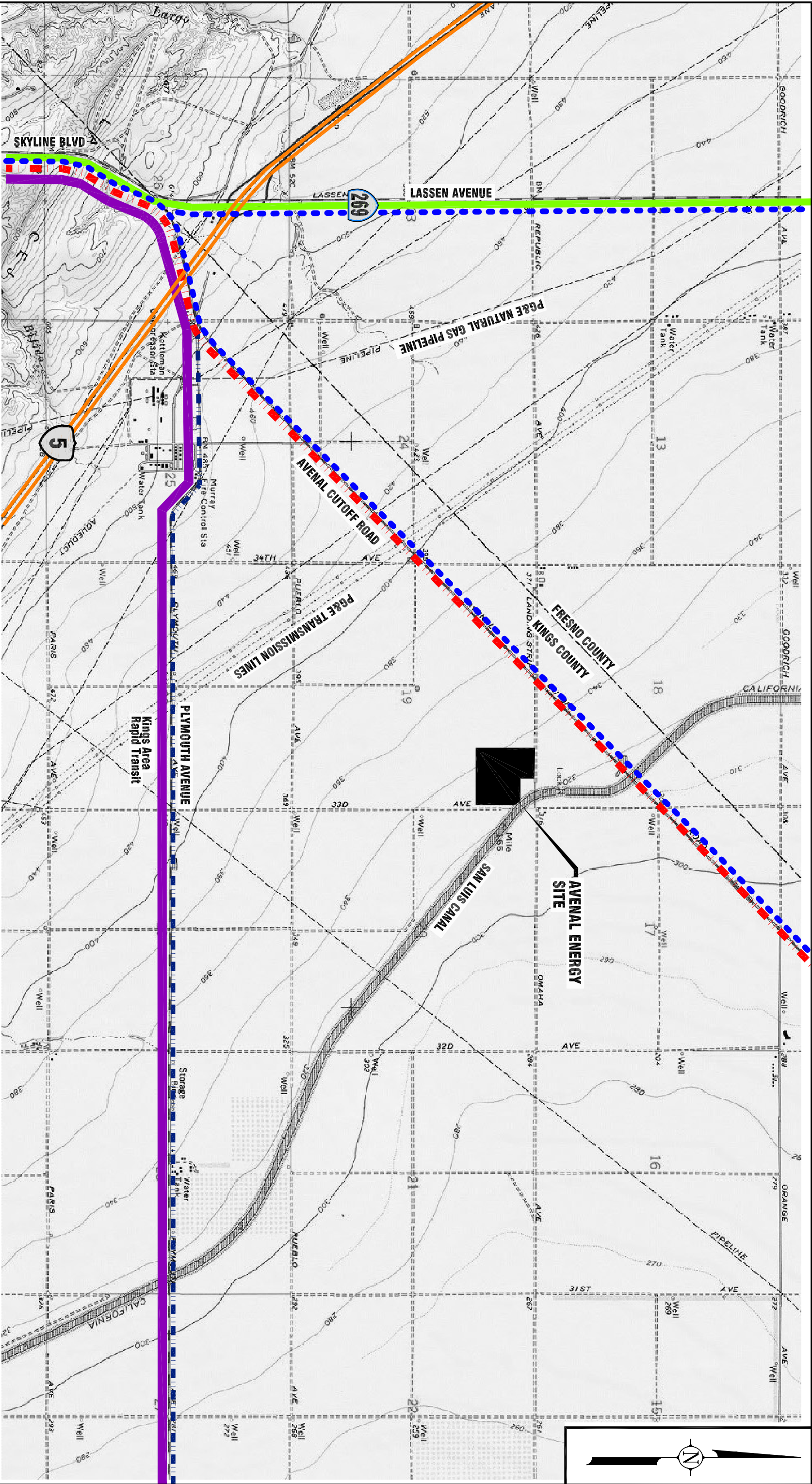
1. TPG Consulting, Inc., "MAP2".Dwg, Dated 9/1/201
2. TOPOI © 2000, National Geographic Holdings WWW.TOPO.COM
3. 1999 Kings County General Plan and Circulation Element
4. Council of Fresno Co. Governments 1998 Regional Transportation plan
5. 2000 Fresno County General Plan and CirculationElement
6. 1992 Avenal General Plan and Circulation Element



REGIONAL ROAD AND RAIL TRANSPORTATION SYSTEM

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AVENAL ENERGY FIGURE 6.11-1



LEGEND:

- Circulation Designations**
- Interstate
 - Principal Arterial
 - Minor Arterial
 - Major Collector
 - Planned Bikeway
- Transit Services**
- Kings Area Rapid Transit (KART) Route

References:

1. TPG Consulting, Inc., "MAP2".Dwg, Dated 9/12/01
2. TOPOI © 2000, National Geographic Holdings WWW.TOPO.COM
3. 1999 Kings County General Plan and Circulation Element
4. Council of Fresno Co. Governments 1998 Regional Transportation plan
5. 2000 Fresno County General Plan and Circulation Element
6. 1992 Avenal General Plan and Circulation Element



SCALE
1 : 24,000

**LOCAL
TRANSPORTATION SYSTEM**

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City of Fresno and beyond. Characteristics of these and other relevant roads and highways in the area are presented in the local traffic and transportation facilities discussion in Section 6.11.1.2.

6.11.1.1.2 Rail Service

The Burlington Northern and Santa Fe (BNSF) Railroad operates a spur located in Corcoran. This spur is connected to the BNSF Railroad's main line that runs through the central portion of California. The San Joaquin Valley Railroad operates on the leased Union Pacific's Coalinga Branch Line that runs east/west between Lemoore and Coalinga. The Coalinga Branch Line connects to the Union Pacific main line that runs along SR 99. Over the next year, the San Joaquin Valley Railroad plans to invest substantial maintenance funds to upgrade the Coalinga Branch Line.

6.11.1.1.3 Air Service

The public and private airports located within approximately 30 miles of the Site are shown in Figure 6.11-1. The nearest regional airport is Fresno-Yosemite International Airport, located approximately 57 miles northeast of the Site. Municipal airports in the area include New Coalinga, located approximately 13 miles to the northwest, Hanford Municipal, approximately 28 miles to the northeast, and Visalia Municipal, approximately 40 miles east of the Site. The Avenal Airport, which is privately owned but open to public use, is more than 7 miles south of the Site and on the opposite side of the Kettleman Hills. Harris Ranch, another privately owned airport open to public use, is approximately 15 miles northwest of the Site. The Lemoore Naval Air Station (NAS), one of four Navy master jet bases in the United States, is located approximately 15 miles northeast of the Site.

6.11.1.1.4 Public Transit

As shown in Figures 6.11-1 and 6.11-2, a Kings Area Rural Transit (KART) route runs along Plymouth Avenue and SR 269/Skyline Boulevard. There are no other public transit facilities in the vicinity of the Site.

6.11.1.1.5 Waterways

There are no vehicle-use waterways in the Project area.

6.11.1.1.6 Other Transportation Facilities

A number of pipeline systems occur in the region. The SWP has an irrigation water distribution system that distributes water to the farmlands in the region and the joint CVP/SWP/San Luis Canal (California Aqueduct) that is adjacent to the Site. Several oil and gas pipelines, including two PG&E natural gas pipelines occur in the area. The PG&E Kettleman compressor station compresses gas for transport along these lines. The Project will be connected to the compressor station for its gas supply. The City of Avenal operates a water pipeline adjacent to Avenal Cutoff Road that delivers water from the city water treatment facility located adjacent to the Site to the Avenal residential and business districts of Avenal and Avenal State Prison across the Kettleman Hills to the southwest.

6.11.1.2 Local Setting

The roads and highways in the Project area are shown in Figure 6.11-2. As shown, the roadway system includes Interstate 5, Avenal Cutoff Road, Plymouth Avenue and Lassen Avenue (SR 269). The classification and design capacities for these roads and highways are listed in Table 6.11-1.

TABLE 6.11-1
ROADS AND HIGHWAYS IN THE VICINITY OF THE PROJECT

STREET	CLASSIFICATION	NO. OF LANES	DAILY DESIGN CAPACITY ⁽¹⁾	POSTED SPEED LIMIT (mph)	WEIGHT & LOAD LIMITATIONS
Interstate 5	Interstate/Freeway	4	80,000 ⁽²⁾	70	Legal load
SR 198	Freeway/Expressway/ Principle Arterial	4	80,000 ⁽²⁾	65	Legal load
SR 41	Rural Highway/ Principle Arterial/ Expressway/Freeway	4	80,000 ⁽²⁾	65	Legal load
SR 269	Principle Arterial/Expressway/ Rural Highway	2	12,000 ⁽²⁾	55	Legal load
Avenal Cutoff Road	Minor Arterial	2	12,000	55	Legal load
Jayne/Nevada Avenue	Expressway/Major Collector	2	18,000	55	Legal load
25 th Avenue	Major Collector/Minor Local	2	18,000	55	Legal load

⁽¹⁾ Daily design capacity interpolated from the City of Avenal General Plan Circulation Element.

⁽²⁾ Capacity shown was taken from the City of Avenal General Plan Circulation Element. Caltrans has jurisdiction over the roadway. Caltrans calculates peak hour capacity using the methodologies per the 2000 Highway Capacity Manual.

Table 6.11-2 shows average daily and peak hour traffic counts, and percentages of passenger vehicles, buses and heavy vehicles (trucks) for key road segments in the vicinity of the Site.

TABLE 6.11-2
AVERAGE DAILY TRAFFIC (ADT) VOLUMES
ON THE EXISTING ROAD SYSTEM

STREET/SEGMENT	AVERAGE DAILY TRAFFIC	PEAK HOUR TRAFFIC	PERCENT OF DAILY TRAFFIC		
			Passenger Vehicles (Percent)	Buses (Percent)	Heavy Vehicles (Percent)
Interstate 5	27,750	3,675	66	---	34
SR 198	13,600	1,300	92	---	8
SR 41	9,600	1,025	89.25	---	10.75
SR 269	2,440	135/160 ⁽¹⁾	69.63	0.82	29.55
Avenal Cutoff Road	2,455	245/128 ⁽¹⁾	90.80	0.12	9.08
Jayne / Nevada Avenue	2,408	187/205 ⁽¹⁾	84.13	0.63	15.24
25 th Avenue	153	31/17 ⁽¹⁾	90.20	0.65	9.15

Source: Annual average daily traffic volumes, peak hour and percentages are shown for Interstate 5, SR 198, and SR 41, and were taken from the Caltrans *2000 Traffic Volumes on California State Highways* and the Caltrans *1998 Annual Average Daily Truck Traffic on the California State Highway System*. Average daily traffic volumes, peak hour and percentages for the remaining segments are based on field data.

(1) Represents AM and PM peak hour volumes developed from field data.

Trucks are allowed on all State Routes, Kings County highways and roads, and City of Avenal roads in the vicinity of the Project. Based on field observations of the road segments, intersections, and ramps being analyzed for this Project, it was determined that two locations contained geometric constraints that tend to increase delay of certain traffic movements. For eastbound semi truck and trailer traffic on Jayne turning southwest on Avenal Cutoff Road, trucks must traverse over the centerline of Avenal Cutoff Road to complete their turning movements. This potentially requires additional delay until a sufficient gap in traffic on Avenal Cutoff Road occurs. For westbound semi truck and trailer traffic turning south on Avenal Cutoff Road, the curb configurations are narrow and it is presumed that additional time is required to avoid or minimize running on top of curbs. Provided that drivers are cautious and careful, these conditions will not adversely affect public safety. (TPG Consulting, Inc., 2001).

Traffic counts on key road segments, intersections and off-ramps in the Site area were performed by TPG Consulting, Inc. in May 2001. Peak traffic hours for these study locations vary slightly,

but generally occur between 5:30 a.m. to 8:00 a.m., and 3:00 p.m. to 5:15 p.m. The existing weekday LOS for the study locations during the peak hours are shown in Table 6.11-3.

Table 6.11-3 also shows the projections for LOS for the road segments, intersections and ramps in the Project area for 2003 and 2004. The projections at these locations are provided to characterize the period when peak Project construction is scheduled (2003) and also the period when the Project is scheduled to begin commercial operation (2004). To be conservative, the traffic analysis assumes a 1 to 2 percent yearly growth factor for traffic volumes on all road segments, ramps and intersections shown in Table 6.11-3. These growth factors are derived from Caltrans projections and discussions with City of Avenal staff.

6.11.1.3 Planned Transportation Facilities

There are no known major new transportation facilities planned in the area of the Site. As shown in Figure 6.11-2, bicycle routes are planned along Avenal Cutoff Road, SR 269 and Jayne Avenue.

6.11.2 IMPACTS

This subsection presents the results of the analysis of potential Project impacts to traffic and transportation systems during both construction and operations. The Project's affects on traffic and transportation systems will not be significant, largely due to the existing light to moderate traffic on most roads and highways in the Site vicinity.

In addition, once construction is completed, the largest routine Project operations shift will consist of 15 to 20 employees with limited delivery traffic (e.g., less than five delivery trucks per day, including UPS, water trucks). This relatively small operations staff will generate very little traffic and have only a negligible long-term affect on levels of service for local traffic and transportation systems.

TABLE 6.11-3

**EXISTING AND PROJECTED⁽¹⁾ LEVELS OF SERVICE
WITHOUT PROJECT WORKERS**

ITEM	EXISTING (2001) LOS - AM ⁽²⁾ /AM ⁽³⁾ /PM	CONSTRUCTION (2003) LOS - AM ⁽²⁾ /PM	OPERATION (2004) LOS - AM ⁽³⁾ /PM
ROAD SEGMENTS			
Avenal Cutoff Road from Site to SR 198	B/B/A	B/A	B/A
SR 269 - I-5 north to Huron	A/A/A	A/A	A/A
SR 269 - I-5 to City of Avenal	A/A/A	A/A	A/A
FREEWAY SEGMENTS			
SR 198 WB off-ramp to Avenal Cutoff Rd.			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB off-ramp to Avenal Cutoff Rd.			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB from Avenal Cutoff Rd.			
• Downstream	A/A/A	A/A	A/A
SR 198 WB off-ramp to SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 WB on-ramp from SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB off-ramp to SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB on-ramp to SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 NB off-ramp to SR 198 EB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A

(1) Freeways and state highways assume a yearly growth rate ranging between 1.5 and 2.5 which is consistent with Caltrans projections. Local roads assume a 1.5 percent yearly growth rate consistent with Section 6.10 (Socioeconomics) investigations.

(2) 6:00 AM to 7:00 AM commute.

(3) 7:00 AM to 8:00 AM commute.

TABLE 6.11-3

**EXISTING AND PROJECTED⁽¹⁾ LEVELS OF SERVICE
WITHOUT PROJECT WORKERS
(Continued)**

ITEM	EXISTING (2001) LOS - AM ⁽²⁾ /AM ⁽³⁾ /PM	CONSTRUCTION (2003) LOS - AM ⁽²⁾ /PM	OPERATION (2004) LOS - AM ⁽³⁾ /PM
SR 41 NB on-ramp from SR 198 EB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 SB on-ramp from SR 198 EB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 SB off-ramp to SR 198 WB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 NB on-ramp from SR 198 WB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
I-5 NB at SR 269			
• S of SR 269 off-ramp	C/C/C	C/C	C/C
• N of SR 269 on-ramp	C/C/C	C/C	C/C
I-5 SB at SR 269			
• N of SR 269 off-ramp	C/C/C	C/C	C/C
• S of SR 269 on-ramp	C/C/C	C/C	C/C
INTERSECTIONS			
I-5 EB off-ramp at SR 269			
• SB Left turn	A/A/A	A/A	A/A
• EB Approach	A/A/A	A/A	A/A
I-5 WB off-ramp at SR 269			
• NB Left turn	A/A/A	A/A	A/A
• WB Approach	A/A/A	A/A	A/A
SR 269 at Avenal Cutoff Road			
• SB Left-turn	A/A/A	A/A	A/A
• Freeways WB Approach	B/B/A	B/A	B/A

(1) Freeways and state highways assume a yearly growth rate ranging between 1.5 and 2.5 which is consistent with Caltrans projections. Local roads assume a 1.5 percent yearly growth rate consistent with Section 6.10 (Socioeconomics) investigations.

(2) 6:00 AM to 7:00 AM commute.

(3) 7:00 AM to 8:00 AM commute.

TABLE 6.11-3

**EXISTING AND PROJECTED⁽¹⁾ LEVELS OF SERVICE
WITHOUT PROJECT WORKERS
(Continued)**

ITEM	EXISTING (2001) LOS - AM ⁽²⁾ /AM ⁽³⁾ /PM	CONSTRUCTION (2003) LOS - AM ⁽²⁾ /PM	OPERATION (2004) LOS - AM ⁽³⁾ /PM
SR 269 at Jayne Avenue	A/A/A	A/A	A/A
Jayne/Nevada Avenue at Avenal Cutoff Road			
• NB Left-turn	A/A/A	A/A	A/A
• SB Left-turn	A/A/A	A/A	A/A
• EB Approach	B/B/B	B/B	B/B
• WB Approach	B/B/A	B/A	B/A
SR 198 EB ramps/Jackson Ave at Avenal Cutoff Road			
• NB Left-turn	A/A/A	A/A	B/A
• SB Left-turn	A/A/A	A/A	A/A
• EB Approach	B/D/B	B/B	D/B
• WB Approach	A/C/A	A/A	C/A
SR 198 WB ramps at Avenal Cutoff Road			
• NB Left-turn	A/A/A	A/A	A/A
• WB Approach	B/B/A	B/A	B/A
SR 198 WB ramps at SR 41 NB			
• NB Left-turn	A/A/A	A/A	A/A
• WB Approach	A/B/B	A/B	B/B
SR 198 WB ramps at SR 41 SB			
• WB Approach	A/B/A	A/A	B/A
SR 198 EB ramps at SR 41			
• SB Left-turn	A/A/A	A/A	A/A
• EB Approach	A/A/A	A/A	A/A
SR 198 at 25 th Avenue	A/A/C	A/C	A/C
25 th Avenue at Avenal Cutoff Road			
• NB Left-turn	A/A/A	A/A	A/A
• EB Approach	B/B/A	B/A	B/A

(1) Freeways and state highways assume a yearly growth rate ranging between 1.5 and 2.5 which is consistent with Caltrans projections. Local roads assume a 1.5 percent yearly growth rate consistent with Section 6.10 (Socioeconomics) investigations.

(2) 6:00 AM to 7:00 AM commute.

(3) 7:00 AM to 8:00 AM commute.

TABLE 6.11-3

**EXISTING AND PROJECTED⁽¹⁾ LEVELS OF SERVICE
WITHOUT PROJECT WORKERS
(Continued)**

ITEM	EXISTING (2001) LOS - AM ⁽²⁾ /AM ⁽³⁾ /PM	CONSTRUCTION (2003) LOS - AM ⁽²⁾ /PM	OPERATION (2004) LOS - AM ⁽³⁾ /PM
RAMPS			
I-5 EB off-ramp to SR 269			
• Upstream	B/B/B	B/B	B/B
• Downstream	B/B/B	B/B	B/B
I-5 EB on-ramp to SR 269			
• Upstream	B/B/B	C/B	C/B
• Downstream	B/B/B	C/B	C/C
I-5 WB off-ramp to SR 269			
• Upstream	B/B/B	B/B	B/B
• Downstream	B/B/B	B/B	B/B
I-5 WB on-ramp to SR 269			
• Upstream	C/C/C	C/C	C/C
• Downstream	C/C/C	C/C	C/C
SR 198 WB off-ramp to Avenal Cutoff Rd			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 WB on-ramp to Avenal Cutoff Rd			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB off-ramp to Avenal Cutoff Rd			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB on-ramp to Avenal Cutoff Rd			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	B/A

(1) Freeways and state highways assume a yearly growth rate ranging between 1.5 and 2.5 which is consistent with Caltrans projections. Local roads assume a 1.5 percent yearly growth rate consistent with Section 6.10 (Socioeconomics) investigations.

(2) 6:00 AM to 7:00 AM commute.

(3) 7:00 AM to 8:00 AM commute.

TABLE 6.11-3

**EXISTING AND PROJECTED⁽¹⁾ LEVELS OF SERVICE
WITHOUT PROJECT WORKERS
(Continued)**

ITEM	EXISTING (2001) LOS - AM ⁽²⁾ /AM ⁽³⁾ /PM	CONSTRUCTION (2003) LOS - AM ⁽²⁾ /PM	OPERATION (2004) LOS - AM ⁽³⁾ /PM
SR 198 WB off-ramp to SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 WB on-ramp to SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB off-ramp to SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 198 EB on-ramp to SR 41			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 off-ramp to SR 198 EB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 NB loop on-ramp from SR 198 EB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 slip on-ramp from SR 198 EB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 off-ramp to SR 198 WB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A
SR 41 NB on-ramp from SR 198 WB			
• Upstream	A/A/A	A/A	A/A
• Downstream	A/A/A	A/A	A/A

31161/Rpts/AFC/Tbls&Figs (6.11) (10/6/01/ks)

*NB = northbound EB = eastbound**SB = southbound**WB = westbound*

(1) Freeways and state highways assume a yearly growth rate ranging between 1.5 and 2.5 which is consistent with Caltrans projections. Local roads assume a 1.5 percent yearly growth rate consistent with Section 6.10 (Socioeconomics) investigations.

(2) 6:00 AM to 7:00 AM commute.

(3) 7:00 AM top 8:00 AM commute.

6.11.2.1 Significance Criteria

Significance criteria were determined based on CEQA Guidelines, Appendix G, Environmental Checklist Form (amended December 1, 1999), and on performance standards or thresholds adopted by responsible agencies. An impact may be considered significant if the Project results in:

- An increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads or congestion at intersections).
- A substantial increase in hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.
- Inadequate emergency access.
- Inadequate parking capacity.
- A conflict with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks).

In addition, the following LOS requirements are recommended by the City of Avenal, Kings County, Fresno County and Caltrans for roads under their jurisdiction.

LOCAL RECOMMENDED LOS REQUIREMENTS.

SOURCE	LOS REQUIREMENT
City of Avenal General Plan	LOS C or better must be maintained on Avenal freeways, highways, arterials and collectors.
Kings County General Plan	Minimum LOS for intersections is D. I-5 and SR 198 in Kings County designated as oversize truck routes.
Fresno County General Plan	Strive to meet minimum of LOS C for county roadways but in no case plan for worse than LOS D.
Council of Fresno County Governments Regional Transportation Plan	Projects must conform with City of Avenal, Kings county, and Fresno County General Plan Traffic Elements.
Caltrans	Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State Highway facilities.

6.11.2.2 Construction Impacts

6.11.2.2.1 Construction Worker Traffic

Project construction worker traffic peaks are projected to occur twice each day: once in the morning as construction workers travel to the Site; and once again in the mid to late afternoon as the construction workers depart the Site at the end of the construction shift. This cycle would be repeated Monday through Saturday during the 20-month Project construction period.

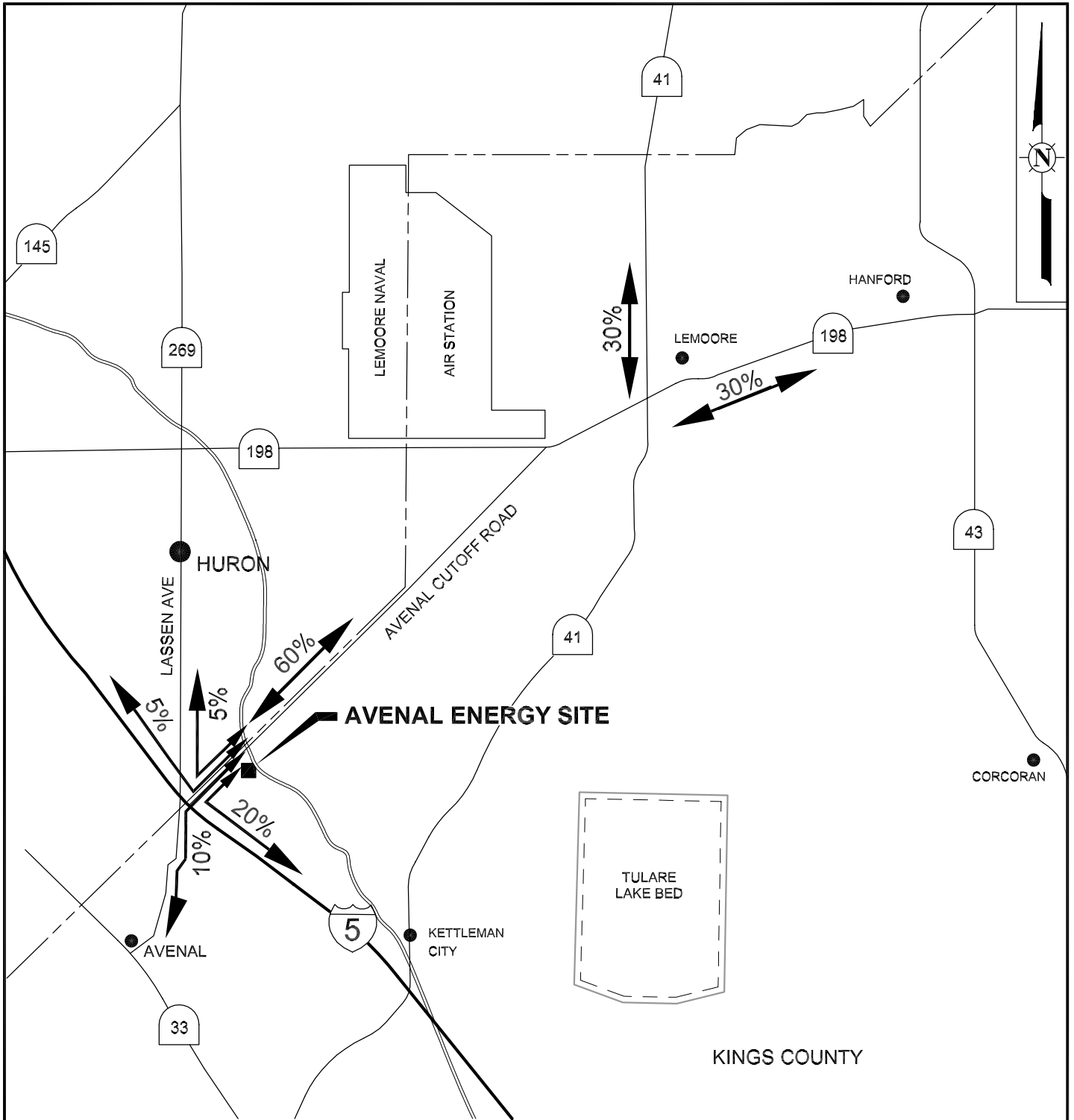
Figure 2.3-13 shows monthly manpower loading for the 20-month construction phase of the Project. As shown, Project manpower rises to a peak of 425 construction workers during months 9 and 10. The average monthly manpower level over the 20-month construction period is 240 construction workers. To analyze maximum potential impacts for the Project, the maximum construction manpower month, with 425 workers, was used. Traffic loading from 5:30 a.m. to 6:30 a.m. (construction workers often arrive early for morning shifts, so traffic counts from a slightly earlier time frame were used) and 5:00 p.m. to 6:00 p.m. was used on the road segments, intersection and off-ramps based on the planned peak staffing period shift schedule.

No special designated employee access routes have been identified for this Project. Instead, the commute routes and quantities of workers using these routes were estimated taking into account the location of union craft workers, population centers where workers would most likely reside and the distances to those population centers. The routes that the construction workers are expected to use commuting to and from the Site, and the percentages of workers using each route, are shown in Figure 6.11-3.

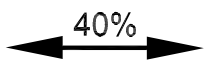
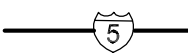
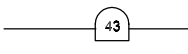
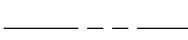
Other key assumptions that form the basis for the Project's construction work traffic analysis are as follows:

- Fifteen percent of the workers will carpool. The rest will drive a separate vehicle to and from the construction site.
- Except for special circumstances, minimal offsite travel will occur during the work day.
- Regular construction work schedule includes a half-hour lunch period, that minimizes opportunities for offsite trips during the work day.
- Each day, the construction shift will typically commence at 7:00 a.m. and end at 5:30 p.m.

Table 6.11-4A shows the existing and "with Project" a.m. and p.m. peak hour LOS for the study locations in the Project area. As described above, during peak manpower loading the daily construction work shift will be from 7:00 a.m. to 5:30 p.m. At lower manpower levels (< 200 workers), early in the Project construction period, some 8-hour shifts will be used. This will cause workers during these lower manpower periods to depart the site at 3:30 p.m. The impact of this shorter shift period is not likely to cause unacceptable declines in LOS due to the much



LEGEND:

-  CONSTRUCTION WORKER
COMMUTE ROUTE TO AND FROM
AND PERCENT USING ROUTE
-  INTERSTATE HIGHWAY
-  STATE HIGHWAY
-  COUNTY LINE

**CONSTRUCTION WORKER COMMUTE
ROUTES TO AND FROM
PROJECT SITE**

DUKE ENERGY AVENAL, LLC
AVENAL ENERGY | **FIGURE 6.11-3**

TABLE 6.11-4A**PROJECTED⁽¹⁾ LEVELS OF SERVICE
CONSTRUCTION**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM ⁽³⁾ /PM	CONSTRUCTION LOS (2003) WITHOUT PROJECT WORKERS - AM ⁽³⁾ /PM	CONSTRUCTION (2003) WITH PROJECT WORKERS - AM/PM
ROAD SEGMENTS			
Avenal Cutoff Road from Site to SR 198	B/A	B/A	C/A
SR 269 - I-5 north to Huron	A/A	A/A	A/A
SR 269 - I-5 to City of Avenal	A/A	A/A	A/A
FREEWAY SEGMENTS			
SR 198 WB off-ramp to Avenal Cutoff Rd.			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to Avenal Cutoff Rd.			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB from Avenal Cutoff Rd.			
• Downstream	A/A	A/A	A/A
SR 198 WB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 WB on-ramp from SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB on-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project construction conditions.

(3) 6:00 a.m. to 7:00 a.m. commute.

TABLE 6.11-4A

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
CONSTRUCTION
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM ⁽³⁾ /PM	CONSTRUCTION LOS (2003) WITHOUT PROJECT WORKERS - AM ⁽³⁾ /PM	CONSTRUCTION (2003) WITH PROJECT WORKERS - AM/PM
SR 41 NB off-ramp to SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 SB on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 SB off-ramp to SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB on-ramp from SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
I-5 NB at SR 269			
• S of SR 269 off-ramp	C/C	C/C	C/C
• N of SR 269 on-ramp	C/C	C/C	C/C
I-5 SB at SR 269			
• N of SR 269 off-ramp	C/C	C/C	C/C
• S of SR 269 on-ramp	C/C	C/C	C/C
INTERSECTIONS			
I-5 EB off-ramp at SR 269			
• SB Left turn	A/A	A/A	A/A
• EB Approach	A/A	A/A	A/A
I-5 WB off-ramp at SR 269			
• NB Left turn	A/A	A/A	A/A
• WB Approach	A/A	A/A	A/A

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project construction conditions.

(3) 6:00 a.m. to 7:00 a.m. commute.

TABLE 6.11-4A

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
CONSTRUCTION
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM ⁽³⁾ /PM	CONSTRUCTION LOS (2003) WITHOUT PROJECT WORKERS - AM ⁽³⁾ /PM	CONSTRUCTION (2003) WITH PROJECT WORKERS - AM/PM
SR 269 at Avenal Cutoff Road			
• SB Left-turn	A/A	A/A	A/A
• WB Approach	B/A	B/A	C/A
SR 269 at Jayne Avenue	A/A	A/A	A/A
Jayne/Nevada Avenue at Avenal Cutoff Road			
• NB Left-turn	A/A	A/A	A/A
• SB Left-turn	A/A	A/A	A/A
• EB Approach	B/B	B/B	B/B
• WB Approach	B/A	B/A	B/B
SR 198 EB ramps/Jackson Ave at Avenal Cutoff Road			
• NB Left-turn	A/A	A/A	A/A
• SB Left-turn	A/A	A/A	A/A
• EB Approach	B/B	B/B	C/C
• WB Approach	A/A	A/A	B/B
SR 198 WB ramps at Avenal Cutoff Road			
• NB Left-turn	A/A	A/A	A/A
• WB Approach	B/A	B/A	B/A
SR 198 WB ramps at SR 41 NB			
• NB Left-turn	A/A	A/A	A/A
• WB Approach	A/B	A/B	A/B
SR 198 WB ramps at SR 41 SB			
• WB Approach	A/A	A/A	A/A
SR 198 EB ramps at SR 41			
• SB Left-turn	A/A	A/A	A/A
• EB Approach	A/A	A/A	A/A
SR 198 at 25 th Avenue	A/C	A/C	A/C

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project construction conditions.

(3) 6:00 a.m. to 7:00 a.m. commute.

TABLE 6.11-4A

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
CONSTRUCTION
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM ⁽³⁾ /PM	CONSTRUCTION LOS (2003) WITHOUT PROJECT WORKERS - AM ⁽³⁾ /PM	CONSTRUCTION (2003) WITH PROJECT WORKERS - AM/PM
25 th Avenue at Avenal Cutoff Road			
• NB Left-turn	A/A	A/A	A/A
• EB Approach	B/A	B/A	B/A
RAMPS			
I-5 EB off-ramp to SR 269			
• Upstream	B/B	B/B	B/B
• Downstream	B/B	B/B	B/B
I-5 EB on-ramp to SR 269			
• Upstream	B/B	C/B	C/C
• Downstream	B/B	C/B	C/C
I-5 WB off-ramp to SR 269			
• Upstream	B/B	B/B	B/B
• Downstream	B/B	B/B	B/B
I-5 WB on-ramp to SR 269			
• Upstream	C/C	C/C	C/C
• Downstream	C/C	C/C	C/C
SR 198 WB off-ramp to Avenal Cutoff Rd			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 WB on-ramp to Avenal Cutoff Rd			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to Avenal Cutoff Rd			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project construction conditions.

(3) 6:00 a.m. to 7:00 a.m. commute.

TABLE 6.11-4A

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
CONSTRUCTION
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM ⁽³⁾ /PM	CONSTRUCTION LOS (2003) WITHOUT PROJECT WORKERS - AM ⁽³⁾ /PM	CONSTRUCTION (2003) WITH PROJECT WORKERS - AM/PM
SR 198 EB on-ramp to Avenal Cutoff Rd			
• Upstream	A/A	A/A	A/A/A
• Downstream	A/A	A/A	B/A
SR 198 WB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 WB on-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB on-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 off-ramp to SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB loop on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 slip on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 off-ramp to SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB on-ramp from SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A

31161/Rpts/AFC/Tbls&Figs (6.11) (10/6/01/ks)

NB = northbound EB = eastbound

SB = southbound

WB = westbound

- (1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.
- (2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project construction conditions.
- (3) 6:00 a.m. to 7:00 a.m. commute.

smaller number of construction workers. As shown in Table 6.11-4A, Project construction inbound traffic and outbound traffic for this worst case assessment is not projected to reduce LOS on local roads and highways to unacceptable levels based on local LOS requirements set forth in Section 6.11.2.1. As a result, Project impacts for construction worker traffic will not be significant.

Finally, minor construction activities will occur in connection with installation of a natural gas pipeline under a portion of Avenal Cutoff Road and Plymouth Road that will provide fuel to the Project once it is operational. The minor construction activities will be short-term and only involve the opening of a narrow trench in the middle of short stretches of road at a time for pipe installation. Typical localized traffic management procedures (cones and flagmen) will be used to minimize traffic impacts.

6.11.2.2.2 Construction Equipment and Material Deliveries

Equipment and materials for construction of the Project will be delivered by truck from various locations. It is anticipated that approximately 2,000 deliveries of equipment, materials and basic supplies will be required for Project construction. The majority of truck deliveries are expected to arrive primarily along either of the following routes: via Interstate 5, exiting onto Avenal Cutoff Road and then to the Site, or along SR-198, onto Avenal Cutoff Road, and then to the Site.

Daily and monthly truck traffic will vary. On average, even with approximately 2,000 deliveries over a 20-month period, only an average of 10 to 15 deliveries will arrive at the Site each day. The number of daily deliveries will reach approximately 110 trucks on only two occasions early in the construction period to support large concrete pours. This traffic evaluation included a worst case assessment that had 15 inbound and 15 outbound trucks traveling along SR 198 from/to the Hanford area to Avenal Cutoff Road and south from/to the Project site. This is considered the worst case because the two intersections that are projected to show the most impact due to existing conditions, SR 198 eastbound ramps at Avenal Cutoff Road and Avenal Cutoff Road at Jayne/Nevada Avenues, are both located along this route.

Based on the light to moderate traffic conditions encountered in the Project area, the traffic analysis determined that addition of this number of delivery trucks to local roads and highways throughout the Project construction period is projected to not cause LOS to be reduced below levels recommended by local authorities (see Section 6.11.2.1 above) at any time of the day. This is largely because the Site has the particular advantage of being in a rural setting with sparse

population and generally low overall traffic levels. As a result, impacts to traffic and transportation systems for construction equipment and deliveries will not be significant.

6.11.2.2.3 Rail Transport and Delivery of Large Equipment and Material

Large items of equipment and materials (i.e., oversize or heavy loads) are expected to be delivered by rail to a location near the Site and then from the railhead location, by truck to the Site.

Equipment to be delivered by rail is anticipated to include transformers, gas turbines, steam turbine, generators, the steam drum, package boilers, and bundles of tubes or pipes. Once the equipment is unloaded, it will be transported to the Site using trucks. If such loads exceed weight or size limits, these movements will be performed under appropriate permits from local or state agencies. These permits are granted after appropriate timing for deliveries and appropriate routes are selected that can handle these types of loads. Given that the impacts from these deliveries are temporary, and are managed by special local and/or state permits, effects to local roads and highways from movement of heavy/oversize loads are not projected to be significant.

Two potential railroads and rail siding locations have been identified as being feasible for the delivery and off-loading of oversize and heavy equipment and materials. One is located in Corcoran and is operated by the Burlington Northern and Santa Fe (BNSF) Railway. The spur is attached directly to BNSF Railway's main line and BNSF has appropriate rail cars to transport Project equipment and materials to this spur. The second identified rail siding is located in Huron and is operated by the San Joaquin Valley Railroad (SJVRR). This spur is currently out of service but the SJVRR has plans to rebuild the spur to a capacity that would handle the Project's oversize and heavy loads. If this spur is completed in time, it will be considered for Project deliveries.

6.11.2.2.4 Construction Hazardous Materials Transportation

Table 6.11-5 and Figure 6.11-4 provide the estimated types and quantities of hazardous materials expected to be used at the Site during construction, plus the estimated number and anticipated routes of delivery trips. These types of materials are routinely transported over California highways throughout the state each day in accordance with applicable federal, state and local safety requirements. In fact, for the Project, the largest quantities of hazardous materials are represented by commonly transported diesel fuel and gasoline for the construction equipment. Project deliveries for diesel fuel, gasoline or otherwise will be required to comply with all

applicable federal, state and local safety requirements for transport of hazardous materials. As a result, impacts from hazardous material transportation will not be significant.

6.11.2.3 Operations and Maintenance Impacts

6.11.2.3.1 Operations Personnel and Deliveries

The Project will be operated and maintained by approximately 30 full-time employees. For purposes of this analysis, these employees are assumed to commute daily to work at the Site, each in their own vehicle. The plant will be operated 24 hours a day, 7 days a week by two 12-hour operating shifts. A Monday through Friday day shift will also be manned by 15 to 20 management, engineering and administrative personnel who will work from 8:00 a.m. to 5:30 p.m.

This analysis considered the impacts of 20 workers arriving to work each morning between 7:00 a.m. and 8:00 a.m., while 4 depart at the same time at the end of the 12-hour night shift. An analysis is also provided for the day shift employees who leave at 5:30 p.m. The operational workers are assumed to follow the same routes as assumed for the construction worker analysis shown in Figure 6.11-3. The impact of these workers on the LOS of the studied roadways is shown in Table 6.11-4B. Due to this very small number of employees, the LOS on all roadways remains the same on a majority of study locations as projected for the period without operation workers (Table 6.11-3). The SR 198 westbound ramps at Avenal Cutoff Road are projected to decline from LOS "B" to LOS "C" during the morning commute. This change is within LOS requirements set by local authorities. Further, daily delivery traffic will be small, with less than five trucks arriving and departing the Site each day. This small amount of delivery traffic will also not cause LOS conditions for any of the study locations to decline below significant levels. As a result, traffic impacts from operations personnel are not considered to be significant.

6.11.2.3.2 Operations Hazardous Materials Transportation

Table 6.11-6 provides a description of various hazardous materials that will be transported to the Site during operation. Hazardous materials transportation will occur in accordance with applicable federal, state and local requirements. Some, such as cleaning chemicals, will be delivered infrequently. Other chemicals that will be delivered on a regular basis include aqueous ammonia, petroleum products, flammable and compressed gases, scale inhibitors, and small quantities of solvent and propane. All of these materials are commonly transported on roads and highways throughout the United States each day in accordance with applicable federal, state and local requirements. The anticipated hazardous delivery routes are also shown in Figure 6.11-4. Because Project hazardous material deliveries will be subject to the same federal, state and local

TABLE 6.11-4B**PROJECTED⁽¹⁾ LEVELS OF SERVICE
OPERATIONS**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM/PM	OPERATIONS LOS (2004) WITHOUT PROJECT WORKERS - AM/PM	OPERATIONS LOS (2004) WITH PROJECT WORKERS - AM/PM
ROAD SEGMENTS			
Avenal Cutoff Road from Site to SR 198	B/A	B/A	B/A
SR 269 - I-5 north to Huron	A/A	A/A	A/A
SR 269 - I-5 to City of Avenal	A/A	A/A	A/A
FREEWAY SEGMENTS			
SR 198 WB off-ramp to Avenal Cutoff Road.			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to Avenal Cutoff Road.			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB from Avenal Cutoff Road.			
• Downstream	A/A	A/A	A/A
SR 198 WB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 WB on-ramp from SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB on-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB off-ramp to SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project operations conditions.

(3) 7:00 a.m. to 8:00 a.m. commute.

TABLE 6.11-4B

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
OPERATIONS
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM/PM	OPERATIONS LOS (2004) WITHOUT PROJECT WORKERS - AM/PM	OPERATIONS LOS (2004) WITH PROJECT WORKERS - AM/PM
SR 41 NB on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 SB on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 SB off-ramp to SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB on-ramp from SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
I-5 NB at SR 269			
• S of SR 269 off-ramp	C/C	C/C	C/C
• N of SR 269 on-ramp	C/C	C/C	C/C
I-5 SB at SR 269			
• N of SR 269 off-ramp	C/C	C/C	C/C
• S of SR 269 on-ramp	C/C	C/C	C/C
INTERSECTIONS			
I-5 EB off-ramp at SR 269			
• SB Left-turn	A/A	A/A	A/A
• EB Approach	A/A	A/A	A/A
I-5 WB off-ramp at SR 269			
• NB Left-turn	A/A	A/A	A/A
• WB Approach	A/A	A/A	A/A
SR 269 at Avenal Cutoff Road			
• SB Left-turn	A/A	A/A	A/A
• WB Approach	B/A	B/A	A/A

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project operations conditions.

(3) 7:00 a.m. to 8:00 a.m. commute.

TABLE 6.11-4B

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
OPERATIONS
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM/PM	OPERATIONS LOS (2004) WITHOUT PROJECT WORKERS - AM/PM	OPERATIONS LOS (2004) WITH PROJECT WORKERS - AM/PM
SR 269 at Jayne Avenue	A/A	A/A	A/A
Jayne/Nevada Avenue at Avenal Cutoff Road			
• NB Left-turn	A/A	A/A	A/A
• SB Left-turn	A/A	A/A	A/A
• EB Approach	B/B	B/B	B/B
• WB Approach	B/A	B/B	B/B
SR 198 EB ramps/Jackson Avenue at Avenal Cutoff Road			
• NB Left-turn	A/A	B/A	B/A
• SB Left-turn	A/A	A/A	A/A
• EB Approach	D/B	D/B	D/B
• WB Approach	C/A	C/A	C/A
SR 198 WB ramps at Avenal Cutoff Road			
• NB Left-turn	A/A	A/A	A/A
• WB Approach	B/A	B/A	C/A
SR 198 WB ramps at SR 41 NB			
• NB Left-turn	A/A	A/A	A/A
• WB Approach	B/B	B/B	B/B
SR 198 WB ramps at SR 41 SB			
• WB Approach	B/A	B/A	B/A
SR 198 EB ramps at SR 41			
• SB Left-turn	A/A	A/A	A/A
• EB Approach	A/A	A/A	A/A
SR 198 at 25 th Avenue	A/C	A/C	A/C
25 th Avenue at Avenal Cutoff Road			
• NB Left-turn	A/A	A/A	A/A
• EB Approach	B/A	B/A	B/A

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project operations conditions.

(3) 7:00 a.m. to 8:00 a.m. commute.

TABLE 6.11-4B

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
OPERATIONS
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM/PM	OPERATIONS LOS (2004) WITHOUT PROJECT WORKERS - AM/PM	OPERATIONS LOS (2004) WITH PROJECT WORKERS - AM/PM
RAMPS			
I-5 EB off-ramp to SR 269			
• Upstream	B/B	B/B	B/B
• Downstream	B/B	B/B	B/B
I-5 EB on-ramp to SR 269			
• Upstream	B/B	C/B	C/B
• Downstream	B/B	C/B	C/C
I-5 WB off-ramp to SR 269			
• Upstream	B/B	B/B	B/B
• Downstream	B/B	B/B	B/B
I-5 WB on-ramp to SR 269			
• Upstream	C/C	C/C	C/C
• Downstream	C/C	C/C	C/C
SR 198 WB off-ramp to Avenal Cutoff Road			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 WB on-ramp to Avenal Cutoff Road			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to Avenal Cutoff Road			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB on-ramp to Avenal Cutoff Road			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	B/A

(1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.

(2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project operations conditions.

(3) 7:00 a.m. to 8:00 a.m. commute.

TABLE 6.11-4B

**PROJECTED⁽¹⁾ LEVELS OF SERVICE
OPERATIONS
(Continued)**

ITEM	EXISTING ⁽²⁾ (2001) LOS - AM/PM	OPERATIONS LOS (2004) WITHOUT PROJECT WORKERS - AM/PM	OPERATIONS LOS (2004) WITH PROJECT WORKERS - AM/PM
SR 198 WB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 WB on-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB off-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 198 EB on-ramp to SR 41			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 off-ramp to SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB loop on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 slip on-ramp from SR 198 EB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 off-ramp to SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A
SR 41 NB on-ramp from SR 198 WB			
• Upstream	A/A	A/A	A/A
• Downstream	A/A	A/A	A/A

31161/Rpts/AFC/Tbls&Figs (6.11) (10/5/01/rw)

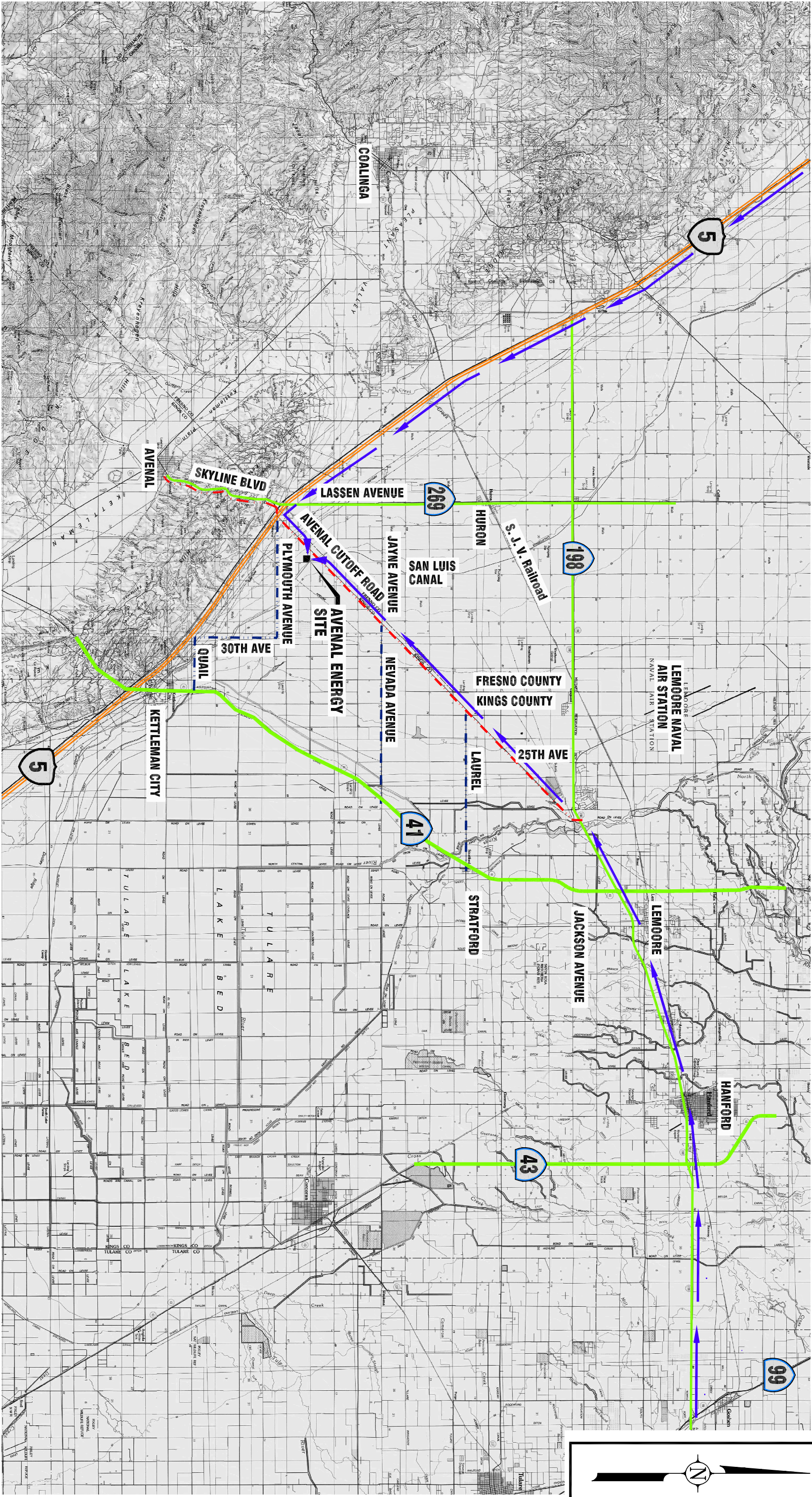
*NB = northbound EB = eastbound**SB = southbound**WB = westbound*

- (1) Includes a yearly growth rate that varies between 1.5 and 2.5 for freeways and state highways; 1.5 percent yearly growth rate for local roads.
- (2) This column is identical to the corresponding column in Table 6.11-3. It is repeated here for convenience to allow comparison to Project operations conditions.
- (3) 7:00 a.m. to 8:00 a.m. commute.

TABLE 6.11-5**CONSTRUCTION HAZARDOUS MATERIAL DELIVERIES**

DESCRIPTION	TOTAL QUANTITY	DELIVERY TRIPS	ANTICIPATED ROUTE ⁽¹⁾	MEANS	SPECIAL HAZARDS
Major Equipment Consumables • Gasoline • Diesel Fuel • Motor Oil	22,200 gallons (gal) Subtotals • 15,000 gal • 7,000 gal • 100 gal	20	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the Site during construction will be via U.S. Department of Transportation (DOT), Caltrans and California Highway Patrol (CHP)-approved methods and routes.
Concrete Form Sealer	400 gal	2	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during construction will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Cold Galvanized Spray 16 oz. Canisters	27 canisters	1	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during construction will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Lubricants Lubricants	100 gal 80 pounds	2 2	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during construction will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Paints	600 gal	8	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during construction will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Fiber Glass-Roll/Board	250,000 square feet	3	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal. Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during construction will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Compressed Gases • Oxygen • Acetylene • Argon	40 cylinders 25 cylinders 18 cylinders	5 5 3	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during construction will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Welding Rod	900 pounds	5	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during construction will be via U.S. DOT, Caltrans and CHP-approved methods and routes.

⁽¹⁾ Actual routes will depend on the vendor location or origin of shipment.



LEGEND:

Circulation Designations

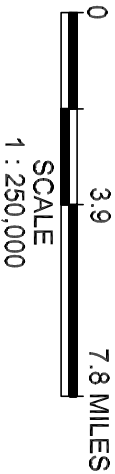
- Interstate
- Principal Arterial
- Minor Arterial
- Major Collector
- Hazardous Materials Transport Route

Reference:

1. TOPOI © 2000, National Geographic Holdings WWW.TOPO.COM

Note:

(1) Actual routes will depend on the vendor location or origin of shipment.



**ANTICIPATED ROUTES
HAZARDOUS MATERIALS TRANSPORT (1)**

DUKE ENERGY AVENAL, LLC

AVENAL ENERGY FIGURE 6.11-4

TABLE 6.11-6
OPERATIONS HAZARDOUS MATERIAL DELIVERIES

DESCRIPTION	QUANTITY	DELIVERY TRIPS	ANTICIPATED ROUTE ⁽¹⁾	MEANS	SPECIAL HAZARDS
Aqueous Ammonia (19 percent by weight)	8,000 gal	4/month	North on I-5 and east on Avenal Cutoff Road to Site.	DOT Code MC 307 tank trucks	None. Aqueous ammonia delivered to the site will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Diesel Fuel	600 gal	2/year	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Sodium Hypochlorite	4,100 gal	2/year	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Sulfuric Acid (93 percent)	6,000 gal	1/month	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Solutions Containing Cyclohexylamine and Morpholine	55 gal	1/month	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Sodium Hydroxide	400 gal	1/month	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Carbohydrazide	400 gal	3/year	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Propane	49 pounds	6/year	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.
Light Petroleum Distillates (solvent)	50 gal	6/year	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans, and CHP-approved methods and routes.
Acetylene	25 pounds	4/year	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans, and CHP-approved methods and routes.
Hydrogen	744 pounds	6/year	I-5 from the south or north and east on Avenal Cutoff Road, or from the east on Avenal Cutoff Road to the Site.	Truck	None. All hazardous materials delivered to the site during operations will be via U.S. DOT, Caltrans and CHP-approved methods and routes.

⁽¹⁾ Actual routes will depend on the vendor location or origin of shipment.

requirements as materials that are currently transported on local roads and highways each day, impacts will not be significant.

Aqueous ammonia will be transported in a 19.0 percent by weight solution of ammonia in water. At this concentration, it is not designated as an inhalation hazard under Section 32101 of the California Vehicle Code. Instead, aqueous ammonia is classified as corrosive. Trucks used to transport aqueous ammonia are subject to design requirements that assure their integrity to hold the material without leaking. These requirements are specified in 49 CFR 171-180. The trucks are subject to regular safety and integrity inspection according to the requirements of the California Department of Transportation (Caltrans) (Foote, 1999). The Enforcement Services Division of the California Highway Patrol (CHP) is responsible for enforcing the hazardous materials regulations; approximately 300 officers are specially trained, in and assigned to, on-highway commercial vehicle enforcement activities.

6.11.2.4 Cumulative Impacts

Projects with potential for cumulative impacts are identified in Section 6.1.4. With the exception of the relatively small City of Avenal water turnout relocation, those projects are located far from the Site and will not have cumulative transportation impacts. The water turnout location, itself, is small in scope and will have only a small number of short-term construction employees (< 10). As a result, impacts from this small activity were estimated to be negligible. Instead, a 1.5 to 2.5 percent growth factor was added to traffic calculations for the Project construction period as well as the operations period for purposes of considering cumulative traffic affects. As shown in the tables, impacts will not be significant.

6.11.2.5 Project Design Features to Avoid or Minimize Impacts

While there are no significant impacts on traffic and transportation from construction and operation of the Project, the following Site characteristics and Project design features assure that the Project will not significantly affect the traffic and transportation facilities:

- Construction deliveries and worker traffic will enter the Site from the Avenal Cutoff Road entrance where improvements (e.g., turning lanes) will be provided based on a special request from the City of Avenal.

- Parking for construction workers will be provided onsite.
- A security gate with a turnaround circle will be within the property to ensure that vehicles waiting to enter the Site are not on the Avenal Cutoff Road.
- Construction traffic control procedures will be implemented addressing timing of heavy equipment and building materials deliveries.

6.11.3 MITIGATION MEASURES

Since there are no significant impacts on traffic and transportation from construction and operation of the Project, no mitigation measures are required.

6.11.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

There are no significant unavoidable adverse impacts on traffic and transportation from either construction or operation of the Project.

6.11.5 LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Laws, ordinances, regulations and standards related to traffic and transportation are summarized in Table 6.11-7 and described in the following subsections. Table 6.11-7 also lists agency representatives, where appropriate, who are familiar with each LORS. Table 6.11-8 lists permits that will be obtained. The timing for obtaining these permits is shown in Figure 2.5-1.

6.11.6 REFERENCES

California Vehicle Code. Section 32101.

Foose, G. California Department of Transportation, District 5 Hazardous Materials Specialist. Personal communication. August 9, 1999.

Sheedy Drayage Co., "Avenal Energy Project, Equipment Transportation Feasibility Study", August 2001.

TPG Consulting, Inc. *Traffic Evaluation Research and Analysis*. September 2001.

TABLE 6.11-7

TRAFFIC AND TRANSPORTATION LORS COMPLIANCE

JURISDICTION	LORS/AUTHORITY	ADMINISTERING AGENCY ⁽¹⁾	REQUIREMENTS/ COMPLIANCE	APPROACH TO COMPLIANCE	AFC SECTION
Federal					
Regulations for the safe transport of hazardous materials.	49 CFR, Chapter II, Subchapter C; and Chapter III, Subchapter B.	Under jurisdiction of states	Requires that transport of hazardous materials be by appropriate class of vehicle.	By meeting standards for the transport of hazardous materials.	Sections 6.11.2.2.4, 6.11.2.3.2 Pages 6.11-15 and 6.11-16
State					
Transport oversized loads over state highways.	California Vehicle Code §35780; California Streets & Highways Code §117, 660-711; 21 CCR §1411.1-1411.6	Caltrans	Requires permit to transport over-size loads over State highways. Enforced by the California Highway Patrol.	By obtaining necessary permits from Caltrans.	Sections 6.11.2.2.2 and 6.11.2.2.3 Pages 6.11-14 through 6.11-15
Transport hazardous materials on state highways.	California Vehicle Code §31300 et seq.	California Highway Patrol	Requires that transport of hazardous materials be on highways that provide the overall shortest transit time.	By selecting route with shortest transit time for transportation of hazardous materials.	Sections 6.11.2.2.4, 6.11.2.3.2 Pages 6.11-15 and 6.11-16
Requirements to have a General Plan.	California Government Code §65302	City of Avenal	City of Avenal must adopt a General Plan with a circulation element.	Avenal has adopted a General Plan. By conforming to the City of Avenal's General Plan.	Section 6.11.2.1 Pages 6.11-11 through 6.11-16
Local					
	City of Avenal General Plan	City of Avenal	LOS C or better must be maintained on Avenal freeways, highways, arterials and collectors.	By not impacting Avenal roadways such that LOS is decreased below C.	Section 6.11.2.1 Pages 6.11-11 through 6.11-16
	Kings County General Plan	Kings County	Minimum LOS for intersections is D. I-5 and SR 198 in Kings County designated as oversize truck routes.	By not impacting Kings County intersections such that LOS is decreased below D.	Section 6.11.2.1 Pages 6.11-11 through 6.11-16
	Fresno County General Plan	Fresno County	Strive to meet minimum of LOS C for county roadways but in no case plan for worse than LOS D.	By not impacting Fresno County roadways such that LOS is decreased below D.	Section 6.11.2.1 Pages 6.11-11 through 6.11-16
	Council of Fresno County Governments Regional Transportation Plan	Council of Fresno County Governments	City of Avenal must adopt a General Plan with a circulation element.	Avenal has adopted a General Plan. By conforming with all applicable Plans' Traffic Elements.	Section 6.11.2.1 Pages 6.11-11 through 6.11-16

31161/Sec 6.11/Tbls&Figs (10/4/01/jb)

(1) Pursuant to CCR Title 20, Appendix B(h)(1)(B): Each agency with jurisdiction to issue applicable permits and approvals or to enforce identified laws, regulations, standards and adopted local, regional, state and federal land permit approval or enforcement authority, but for the exclusive authority of the Commission to certify sites and related facilities.

TABLE 6.11-8

**ADMINISTRATIVE AGENCY CONTACTS
AND PERMITTING APPROVAL AUTHORITIES
TRAFFIC AND TRANSPORTATION**

LOCAL AUTHORITY OVERSIGHT/ENFORCEMENT AND AGENCY CONTACTS	PERMITTING/APPROVAL AUTHORITY
Caltrans Dee Garcia North Region Transportation Office 1304 "O" Street Sacramento, California 95814 (916) 322-4954	Heavy/Oversize Load Permit.
City of Avenal Jim Doughty 919 Skyline Blvd. Avenal, California 93204 (559) 386-5766	Advisory.

31161/Sec 6.11/Tbls&Figs (10/6/01/ks)